Mr. Garland Wilson
Wilson Burial Vault, Inc.
P. O. Box 429
Huntington, Indiana 46750

Dear Mr. Wilson

Re: Exempt Construction and Operation Status,
069-12266-00061

The application from Wilson Burial Vault, Inc. received on May 12, 2000, has been reviewed. Based on the data submitted and the provisions in 326 IAC 2-1.1-3, it has been determined that the following equipment to be used at a new human crematory, to be located at 446 West Markle Road, Huntington, Indiana, is classified as exempt from air pollution permit requirements:

(a) One (1) crematory incinerator, model Power-Pak II, IEEC capable of incinerating 100 pounds of human remains per hour, with supplemental natural gas fuel at a rate of 1.7 million British Thermal Units per hour (mmBtu/hr).

The following conditions shall be applicable:

(1) Opacity Limitations [326 IAC 5-1-2]

Pursuant to 326 IAC 5-1-2 (Opacity Limitations) except as provided in 326 IAC 5-1-3 (Temporary Exemptions), opacity shall meet the following:

(a) Opacity shall not exceed an average of forty percent (40%) in any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.

(b) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of 15 minutes (60 readings) in a 6-hour period as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuos opacity monitor in a six (6) hour period.

(2) Incinerators [326 IAC 4-2-2]

Pursuant to 326 IAC 4-2-2 , the proposed crematory incinerator, model Power-Pak II shall:

(a) Consists of primary and secondary chambers or the equivalent;
(b) Be equipped with a primary burner unless burning wood products;
(c) Comply with 326 IAC 5-1 and 326 IAC 2;
(d) Be maintained properly as specified by the manufacturer and approved by the commissioner;
(e) Be operated according to the manufacturer recommendations and only burn waste approved by the commissioner;
(f) Comply with other state and/or local rules or ordinances regarding installation and operation of incinerators;
(g) Be operated so that emissions of hazardous material including, but not limited to, viable pathogenic bacteria, dangerous chemicals or gases, or noxious odors are prevented;
(h) Not emit particulate matter in excess of:

(1) five-tenths (0.5) pounds of particulate matter per one thousand (1,000) pounds of dry exhaust gas at standard conditions corrected to fifty percent (50%) excess air; and

(i) Not create nuisance or a fire hazard.

If any of the above result, the burning shall be terminated immediately.

This exemption is the first air approval issued to this source.

An application or notification shall be submitted in accordance with 326 IAC 2 to the Office of Air Management (OAM) if the source proposes to construct new emission units, modify existing emission units, or otherwise modify the source.

Sincerely,

Paul Dubenetzky, Chief
Permits Branch
Office of Air Management

APD

cc: File - Huntington County
Huntington County Health Department
Air Compliance - Ryan Hillman
Permit Tracking - Janet Mobley
Technical Support and Modeling - Michele Boner
Compliance Data Section - Karen Nowak

Indiana Department of Environmental Management
Office of Air Management

Technical Support Document (TSD) for an Exemption

Source Background and Description

Source Name:	Wilson Burial Vault, Inc.
Source Location:	446 West Markle Road, Huntington, Indiana
County:	Huntington
SIC Code:	7261
Operation Permit No.:	069-12266-00061
Permit Reviewer:	Aida De Guzman

The Office of Air Management (OAM) has reviewed an application from Wilson Burial Vault, Inc. relating to the construction and operation of the following equipment to be used at a new human crematory to be located at 446 West Markle Road, Huntington, Indiana:

(a) One (1) crematory incinerator, model Power-Pak II, IEEC capable of incinerating 100 pounds of human remains per hour, with supplemental natural gas fuel at a rate of 1.7 million British Thermal Units per hour (mmBtu/hr).

Stack Summary

Stack ID	Operation	Height (feet)	Diameter (feet)	Flow Rate (acfm)	Temperature (^{0}F)
#1	Cremation	17	1.7	2200	1000

Recommendation

The staff recommends to the Commissioner that the construction and operation be approved. This recommendation is based on the following facts and conditions:

Unless otherwise stated, information used in this review was derived from the application and additional information submitted by the applicant.

A complete application for the purposes of this review was received on May 12, 2000.

Emission Calculations

(a) Incinerator Supplemental Natural Gas Fuel Combustion: See Page 1 of 1 TSD Appendix A of this document for detailed emissions calculations*.*

(b) Human (Type IV waste) Cremation (Power-Pak II, IEEC) Emissions :

The following Emission factors were taken from the EPA website, which were the results of stack testing from a human crematory supplied by Industrial Equipment and Engineering Company. The test done was for a larger unit, Ener-Tek IE43-ET

incinerator, with a capacity of 250 pounds per hour (lb/hr).

Crematory Stack Testing Results (Ener-Tek IE43-ET @ 250 lb/hr)	
Nitrogen Oxides (NOx)	30.1 ppm
Volatile organic Compounds (VOC)	0.5 ppm
Particulate	0.026 gr/dscf @ 7% O2
Hydrochloric Acid	0.0235 lb/hr

Proposed Power-Pak II, IEEC Emissions:

(1) Nitrogen Oxide (NOx):

Proposed Power-Pak II incinerator capacity - 100 lb/hr
Stack Tested Ener-Tek IE43-ET incinerator capacity - 250

Emission rate for Ener-Tek based on the stack test results:
(30 ppm * 640 dscm * 60 min/hr * 0.0283 m^3/ft^3
* 1.88 mg/m^3/ppmv) / (453,600 mg/lb) = 0.136 lbs/hr

Proposed Power-Pak II incinerator NOx emissions = $\frac{100 \text{ lb/hr}}{250 \text{ lb/hr}} * 0.136$ lbs/hr

= 0.0544 lbs NOx/hr
= 0.0544 lbs NOx/hr * ton/2000 lb * 8760 hr/yr
= **0.24 ton NOx/yr**

(2) Volatile Organic Compounds (VOC):

Emission rate for Ener-Tek based on the stack test results:
(0.5 ppmv * 640 dscf * 60 min/hr * 0.0283 m^3/ft^3
* 0.65 mg/m^3/ppmv) / (453,600 mg/lb) = 0.001 lb/hr

Proposed Power-Pak II incinerator VOC emissions = $\frac{100 \text{ lb/hr}}{250 \text{ lb/hr}} * 0.001$ lb/hr

= 0.0004 lb/hr
= 0.0004 lb/hr * ton/2000lb * 8760 hr/yr
= **0.002 ton VOC/yr**

(3) Sulfur Dioxide (SO2):

Using AP-42 Emission factor, table 2.1-12 (2.5 lb/ton)

Proposed Power-Pak II incinerator SO2 emissions = 100 lb/hr * 2.5 lb/ton * ton/2000 lb * 8760 hr/yr * ton/2000 lb
= **0.55 ton/ SO2yr**

(4) Carbon Monoxide (CO):

Power-Pak II crematory with a capacity of 125 lb/hr was also stack tested for CO. The CO emissions from the test is 0.007 lb/hr.

Proposed Power-Pak II incinerator CO emissions = $\frac{100 \text{ lb/hr}}{125 \text{ lb/hr}} * 0.007 \text{ lb/hr}$
= 0.006 lb/hr
= 0.006 lb/hr * 8760 hr/yr * ton/200 lb
= **0.026 ton CO/yr**

(5) Particulate Matter Emissions:
PM/PM10 Emission rate for Ener-Tek based on the stack test results = 0.026 gr/dscf @ 7% O_2
= 0.103 lb/hr

Proposed Power-Pak II incinerator PM/PM10 emissions = $\frac{100 \text{ lb/hr}}{250 \text{ lb/hr}} * 0.103 \text{ lb/hr}$
= 0.04 lb/hr
= 0.04 lb/hr * 8760 hr/yr * ton/200 lb
= **0.18 ton PM/PM10/yr**

Compliance with the PM emissions limit in 326 IAC 4-2-1(8)(B):
PM emission limit - 0.5 lb of PM/1000 pounds of dry exhaust gas at standard condition corrected to 50% excess air.

Flow rate of flue gas = 2200 acfm
Temperature of the flue gas = 1000 ^{0}F

Oxygen level in flue gas = 10.6%
Nitrogen level in flue gas = 82.1%

% Excess air = (% O_2 - 0.5% CO) * 100% / (0.264%N_2) - (% O_2 - 0.5% CO)
= (% O_2) * 100% / (0.264% N_2 - %O_2)
= (10.6) * 100% / (0.264% * 82.1% -10.6)
= 96%

Correction factor for 50% excess air = (100 + %EA) / 150
= (100 + 96%) / 150
= 1.3

Particulate matter per pound of flue gas = (0.083 lb PM/hr) / 2000 ft^3/min of flue gas
= 0.00004 lb/hr

Density of flue gas = P/RT
R = 54.5 ft lbf /lbm ^{0}R
P (density) = 2117 lbf/ft^2) / (54.5 ft lbf/lbm ^{0}R / 1180 + 460 ^{0}R
= 0.024 lbm/ft^3

Particulate per pound of flue gas = (0.083 lb/hr) / (2000 ft^3/min) * (0.024 lbm/ft^3) * (60 min/hr)
= 5.9 x 10^{-5} lb particulate / lb flue gas

Particulate per 1,000 pounds of flue gas = 5.9 x 10^{-5} lb particulate / lb flue gas * 1000 lb of flue gas * 1.3
= 0.077 lbs < 0.5 lbs

(6) HAP (HCL) Emissions:
Small amount of hydrochloric acid (HCL) is emitted that is coming from the containers

used to hold the remains.
HCL Emission rate for Ener-Tek based on the stack test results = 0.0235 lb/hr

Proposed Power-Pak II incinerator HCL Emission = 100 lb/hr * 0.0235 lb/hr / 250 lb/hr
= 0.009 lb/hr
= 0.009 lb/hr * 8760 hr/yr * ton/2000 lb
= **0.04 ton HCL/yr**

Potential To Emit Before Controls

Pursuant to 326 IAC 2-1.1-1(16), Potential to Emit is defined as "the maximum capacity of a stationary source or emissions unit to emit any air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of a source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or type or amount of material combusted, stored, or processed shall be treated as part of its design if the limitation is enforceable by the U. S. EPA, the department, or the appropriate local air pollution control agency."

Pollutant	Potential To Emit (tons/year)
PM	0.18
PM-10	0.28
SO_2	0.55
VOC	0.002
CO	0.626
NO_x	0.94

HAP's	Potential To Emit (tons/year)
Hydrochloric Acid	0.04
TOTAL	0.04

Justification for Modification

This is a proposed new source and this is the first air approval that will be issued to it. Pursuant to 326 IAC 2-1.1-3(d), the source is exempted because each pollutant will be emitted below the threshold that requires a registration or permit.

County Attainment Status

The source is located in Huntington County.

Pollutant	Status (attainment, maintenance attainment, or unclassifiable; severe, moderate, or marginal nonattainment)
PM-10	attainment
SO_2	attainment
NO_2	attainment
Ozone	attainment
CO	attainment
Lead	not determined

(a) Volatile organic compounds (VOC) and oxides of nitrogen (NOx) are precursors for the formation of ozone. Therefore, VOC emissions are considered when evaluating the rule applicability relating to the ozone standards. Huntington County has been designated as attainment or unclassifiable for ozone. Therefore, VOC and NOx emissions were

reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2 and 40 CFR 52.21.

(b) Huntington County has been classified as attainment or unclassifiable for all other criteria pollutants. Therefore, these emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2 and 40 CFR 52.21.

Source Status

New Source PSD Definition (emissions after controls, based on 8,760 hours of operation per year at rated capacity):

Pollutant	Potential To Emit (tons/year)
PM	0.18
PM-10	0.28
SO_2	0.55
VOC	0.002
CO	0.626
NO_x	0.94
Single HAP (HCL)	0.04

(a) This new source is **not** a major stationary source because no attainment pollutant is emitted at a rate of 250 tons per year or greater and it is not in one of the 28 listed source categories. Therefore, pursuant to 326 IAC 2-2, and 40 CFR 52.21, the PSD requirements do not apply.

Part 70 Permit Determination

326 IAC 2-7 (Part 70 Permit Program)

This new source is not subject to the Part 70 Permit requirements because the potential to emit (PTE) of:

(a) each criteria pollutant is less than 100 tons per year,
(b) a single hazardous air pollutant (HAP) is less than 10 tons per year, and
(c) any combination of HAPs is less than 25 tons/year.

This is the first air approval issued to this source.

Federal Rule Applicability

(a) New Source Performance Standards (NSPS):
There are no New Source Performance Standards (NSPS)(326 IAC 12 and 40 CFR Part 60) applicable to this source.

(b) National Emission Standards for Hazardous Air Pollutants (NESHAPs)
There are no National Emission Standards for Hazardous Air Pollutants (NESHAPs)(326 IAC 14 and 40 CFR art 63) applicable to this source.

State Rule Applicability - Entire Source

(a) 326 IAC 2-6 (Emission Reporting)
This source is located in Huntington County, which is not one of the listed counties for this rule. Additionally, the source does not have the potential to emit CO, VOC, NO_x, PM-10, or SO_2 at greater than a 100 ton per year rate. Therefore, 326 IAC 2-6 does not apply.

(b) 326 IAC 5-1 (Visible Emissions Limitations)

Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-3 (Temporary Exemptions), opacity shall meet the following, unless otherwise stated in this permit:

(1) Opacity shall not exceed an average of forty percent (40%) any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.

(2) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of fifteen (15) minutes (sixty (60) readings) as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuous opacity monitor) in a six (6) hour period.

State Rule Applicability - Individual Facilities

(a) 326 IAC 4-2-2 (Incinerators)
The proposed crematory incinerator for human remains, model Power-Pak II, is subject to 326 IAC 4-2. This rule requires that the proposed crematory incinerator shall meet the following:

(1) Consists of primary and secondary chambers or the equivalent;
(2) Be equipped with a primary burner unless burning wood products;
(3) Comply with 326 IAC 5-1 and 326 IAC 2;
(4) Be maintained properly as specified by the manufacturer and approved by the commissioner;
(5) Be operated according to the manufacturer recommendations and only burn waste approved by the commissioner;
(6) Comply with other state and/or local rules or ordinances regarding installation and operation of incinerators;
(7) Be operated so that emissions of hazardous material including, but not limited to, viable pathogenic bacteria, dangerous chemicals or gases, or noxious odors are prevented;
(8) Not emit particulate matter in excess of:
  (A) five-tenths (0.5) pounds of particulate matter per one thousand (1,000) pounds of dry exhaust gas at standard conditions corrected to fifty percent (50%) excess air; and
(9) Not create nuisance or a fire hazard.

If any of the above result, the burning shall be terminated immediately.

The source is in compliance with these requirements of the rule, including the PM emission limit of 0.5 pounds per thousand pounds of dry exhaust gas at standard condition corrected to 50% excess air. See pages 3 and 4 of this TSD for detailed calculation.

(b) 326 IAC 7-1.1 (Sulfur Dioxide Emission Limitation)
This rule applies to all facilities with a potential to emit twenty-five (25) tons per year or ten (10) pounds per hour of sulfur dioxide shall comply with the emission limitation in section 2 of this rule.

This rule is not applicable to the proposed crematory incinerator, because it does not have the potential to emit twenty-five (25) tons of sulfur per year or ten (10) pounds of sulfur per hour.

(c) 326 IAC 9-1-1 (Carbon Monoxide Emission Limit)
This proposed natural gas fired crematory incinerator burns the waste gas stream in a

secondary chamber, which is equivalent to a direct-flame afterburner. Therefore, this incinerator is in compliance with this rule.

(d) 326 IAC 2-4.1 (New Source Toxics Control)
This rule applies to major sources of hazardous air pollutants (HAPs). The proposed source is not subject to this rule because it is emitting Hydrochloric Acid (HCL) at a rate of less than 10 tons per year.

Conclusion

The construction and operation of this human crematory incinerator shall be subject to the conditions of the attached proposed **Exemption 069-12266-00061.**

Appendix A: Emissions Calculations
Natural Gas Combustion Only
MM BTU/HR <100
Small Industrial Boiler

Company Name: **Wilson Burial Vault, Inc.**
Address City IN Zip: **446 West Markle Road, Huntington, Indiana**
Exemption No.: **069-12266-00061**
Reviewer: **Aida De Guzman**
Date Received: **May 12, 2000**

Heat Input Capacity MMBtu/hr	Potential Throughput MMCF/yr
1.7	14.9

Pollutant

	PM*	PM10*	SO2	NOx	VOC	CO
Emission Factor in lb/MMCF	1.9	7.6	0.6	100.0 **see below	5.5	84.0
Potential Emission in tons/yr	0.0	0.1	0.0	0.7	0.0	0.6

*PM emission factor is filterable PM only. PM10 emission factor is filterable and condensable PM10 combined.
**Emission Factors for NOx: Uncontrolled = 100, Low NOx Burner = 50, Low NOx Burners/Flue gas recirculation = 32

Methodology

All emission factors are based on normal firing.
MMBtu = 1,000,000 Btu
MMCF = 1,000,000 Cubic Feet of Gas

Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1 MMCF/1,000 MMBtu
Emission Factors are from AP 42, Chapter 1.4, Tables 1.4-1, 1.4-2, 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03 (SUPPLEMENT D 3/98)
Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton
Note: Check the applicable rules and test methods for PM and PM10 when using the above emission factors to confirm that the correct factor is used (i.e., condensable included/not included).